Product Technical Specification Confirmation

Product Name： QB-RS663 Card Reader Module

Product Model： QB-RS663

Product SN： QB-RS663-V0.1A

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1.Product Introduction

OM9663 is the main chip used on QB-RS663 RFID reader model.OM9663 is the multi-protocol RF read card IC launched by NXP company.It is RF card reading IC with most supported protocols so far. OM9663 is a highly integrated transceiver chip, which is used on non contact communication for 13.56MHz. It directly drives the external antenna through the built-in transmitter to communicate with ISO/IEC 14443A or MIFARE card without additional active circuit.The digital module is responsible for all ISO/IEC 14443A framing and error detection function(parity check and CRC)。

2.Product Characteristics

• Support SO/IEC 14443A/MIFARE as MIFARE Classic 1K， MIFARE Classic 4K， MIFARE Ultralight， MIFARE Ultralight C， MIFARE PLUS and MIFARE DESFire;

• Support SO/IEC 14443IB

• Support the demodulation and decoding of felica coded signal. FeliCa receiver devices provide demodulation and decoding circuits for FeliCa coded signals.It supports FeliCa’s higher two-way transmission speed up to 424k bits/s.

• Support the passive initiator mode corresponding to ISO/IEC 18092

• Support ISO/IEC 15693

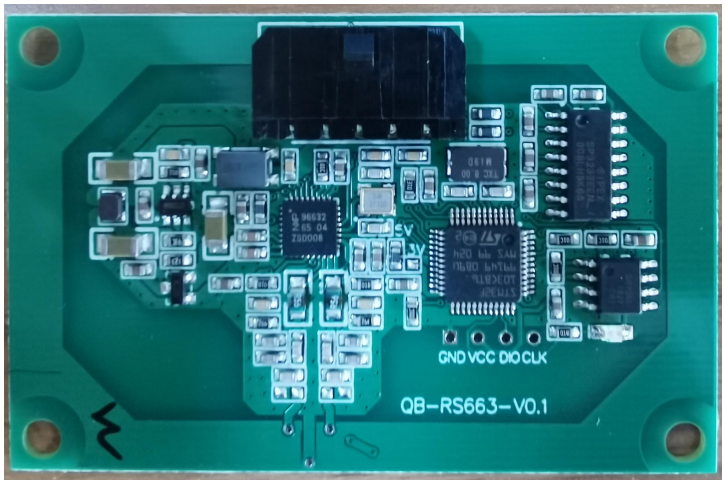
• Support the P2P passive initiator mode consistent with ISO/IEC 18092

• Support the close range communication protocol consistent with ISO/IEC 15693， EPC UID and ISO/IEC 18000-3 mode 3/ EPC Class-1 HF.

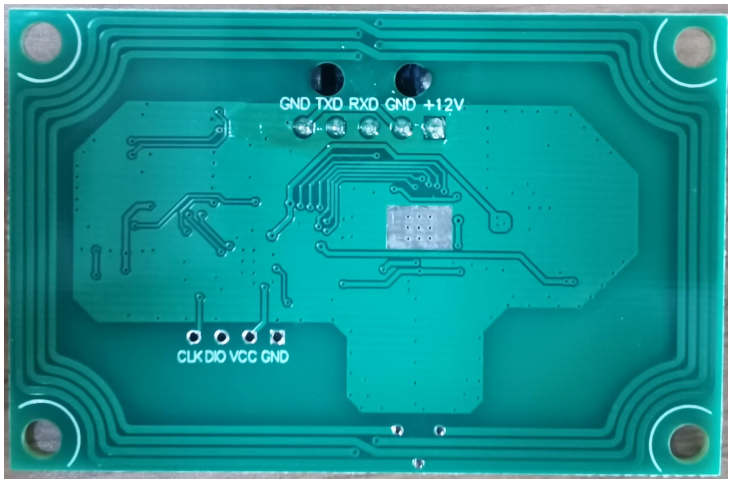
3.Product Technical Specification

Electrical Specifications	
Working Current	40-60mA@ DC 12V
Idle Current	5-10mA@DC 12V
Sleep Current	<80uA
Peak Current	<80mA
Working Frequency	13.56MHz +/- 0.3KHz
Communication Distance	≦4.5cm@DESFire
Mechanical Specifications	
Product Size：	65mm×42mm×6mm
Working Temp(℃)	-40~85
Storage Temperature(℃)	-40~85

4.Product Picture

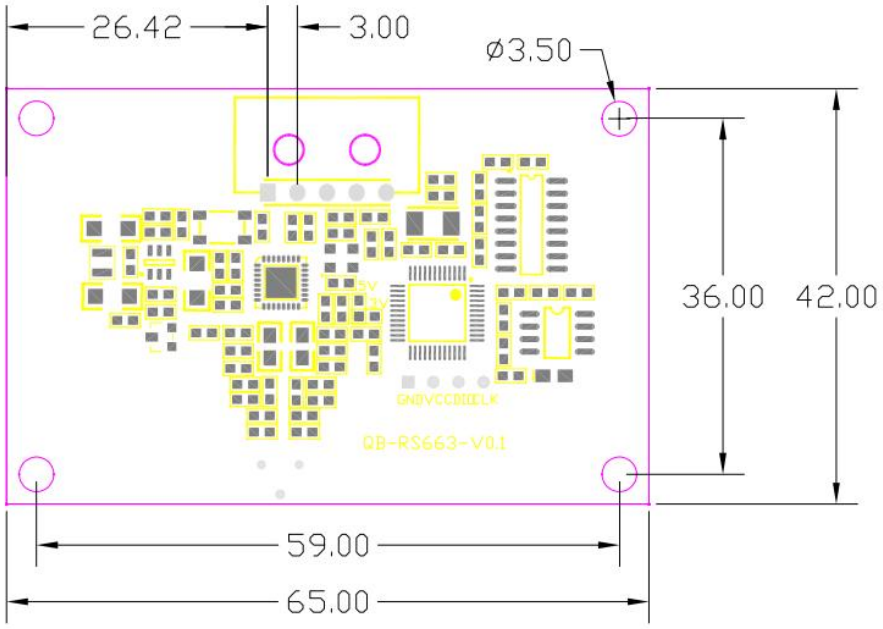


Device-Layer View



Antenna-Layer View

5.Product Specification Chart



6.Pin Definition Diagram

SN	Pin Name	Function	
1	+12V	Power supply	The power supply current should more than 100mA,LDO is recommend
2	GND	Power supply ground	
3	RXD	RS232 RXD	User TXD
4	TXD	RS232 TXD	User RXD
5	GND	Power supply ground	

7.Communication protocol

The communication is initiated by the host computer (command packet)， and the reader-board returns ACK data (response packet) after receiving the command.

Command packet：
0x02 CMD LEN DATA LRC 0x03
explain
0x02：starting character
CMD：command code
LEN：2-byte DATA field length
DATA：Data field(optional field, when LEN is 0x0000, data field has no data)
LRC：Parity Check Codes, byte by byte or value of all data in the packet (excluding the start character of 0x02 and the end character of 0x03)
0x03：terminator

Response packet：
0x02 CMD STATUS LEN DATA LRC 0x03
explain
0x02：starting character
CMD：command code, same as the command code in the command package to be answered
STATUS：status code: success code 0x00 and failure code 0x5A
LEN：2 bytes DATA field length

DATA： data field (optional fields: there is no data in the data field when LEN is 0x0000)
LRC： Parity Check Codes, byte by byte or value of all data in the packet (excluding the start character of 0x02 and the end character of 0x03)
0x03： terminator

Card type:

= 0x4400-Mifare_UltraLight
= 0x0400-Mifare_One(S50) M1/CPU 卡
= 0x0200-Mifare_One(S70) M1
= 0x0800-Mifare_Pro(X)) CPU
= 0x4403-Mifare_DESFire M3

8.Command Table

1. Get device information

Used to get the software version number
command：
CMD： 0x01
DATA： nothing
answer：
DATA： software version number

2. Card search

Check whether there is a card in the range of card reading command:
CMD： 0x10
DATA： nothing
answer:
STATUS: 0x00 success 0x5A: No card
(when the card search is successful)DATA： Card Type： 2 byte card types

Uid_Len	1 byte uid length
Uid	card unique identification number

Explain: After receiving the command, the card reader enters the automatic card searching state and returns the response. It will continue the automatic card search later. It returns new result when the card search result changes (from card to card free, or from card free to card present).

3. Contactless CPU /M3 card reset

command：
CMD： 0x11
DATA： nothing
answer：
DATA： card reset response data

4. CPU card command interaction

command：
CMD： 0x12
DATA： CPU card command
answer：
DATA： data returned by card after execution

5. M1 card verification password

command：
CMD： 0x13
DATA： Mode: 1 byte 0x00 verify A password 0x04 verify B password
Sector: 1 byte verify the sector number of the password
passbuf: 6 bytes password

answer：
DATA：　nothing

6. M1 card reading

command：
CMD：　0x14
DATA：　Adr:　1 byte block number
answer：
DATA：　R_Data:　16 bytes data

7. M1 card writing

command：
CMD：　0x15
DATA：　Adr:　1 byte block number
　　data：　16 bytes data
answer：
DATA：　none

8. Desfire card AID choice

command：
CMD：　0x16
DATA：　AID:　1 byte AID number
answer：
DATA：　none

9. Desfire card key authentication

command：

CMD： 0x17
DATA： KNO： 1 byte key number
password： 16 byte key number
answer：
DATA： password2: 16 byte encryption key

10. Desfire card key modification

command：
CMD： 0x18
DATA： KNO： 1 byte key number
password： 16 byte new key
password2: 16 byte encryption key(returned by key authentication)
answer：
DATA： none

11. Desfire card read file

command：
CMD： 0x19
DATA： FNO： File 1 byte
answer：
DATA： R_DATA: 32 byte data

12. Desfire card write file

command：
CMD： 0x1A
DATA： FNO： File 1 byte
W_DATA： 32 bytes writing data
answer：

DATA： none

13. M1 card read file (merge instruction)

command：

CMD： 0x1B

DATA： Mode: 1 byte 0x00 verify A password 0x04 verify B password

Sector: 1 byte sector for password verification

Adr : 1 byte block number

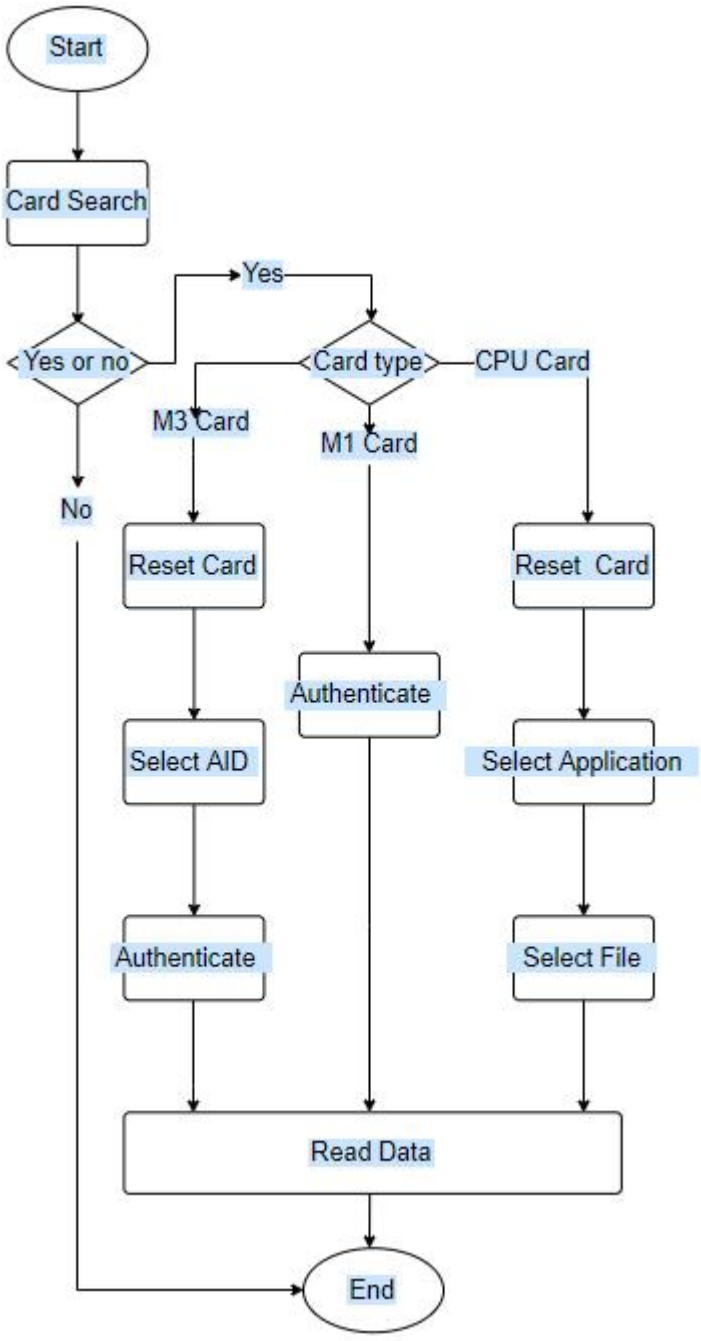
passbuf: 6 bytes

answer：

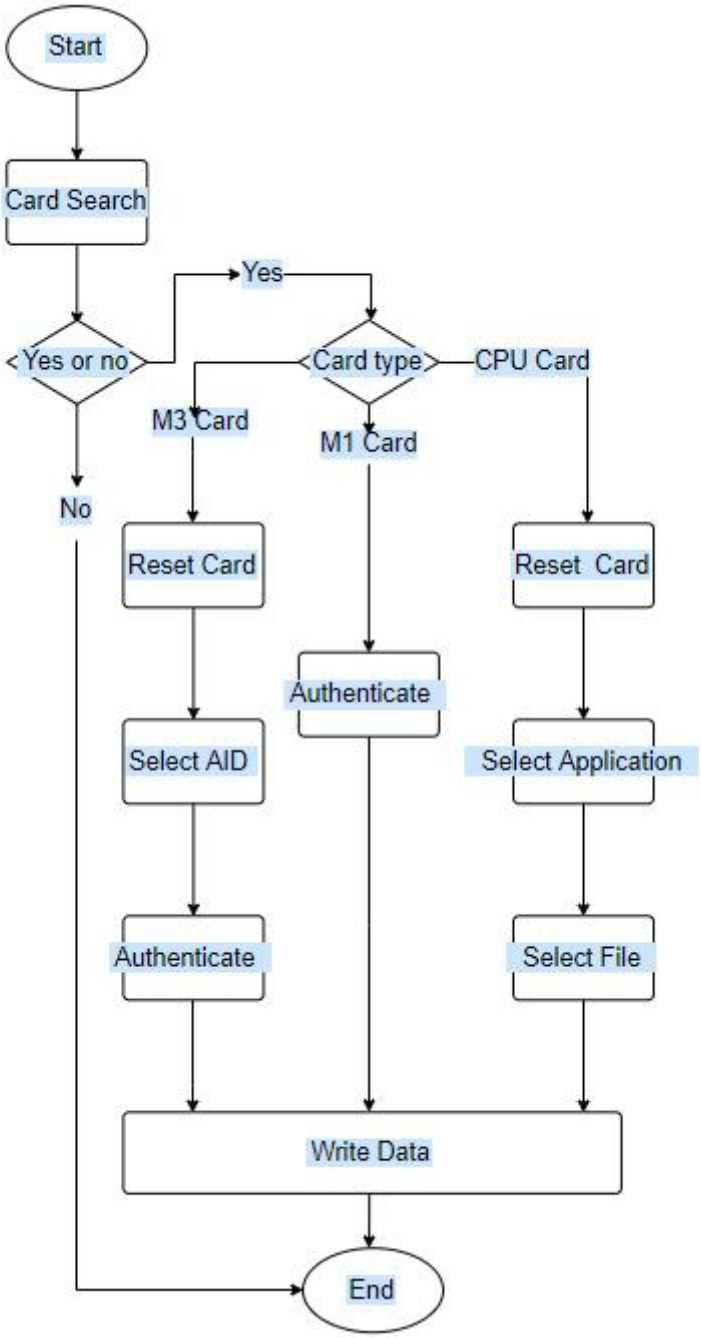
DATA： 16 byte data

9.Flow Diagram

1. Card reading process



2. Card Writing Process



10.Attention

1、 As the electromagnetic wave in 13.56MHz band can be absorbed by water and other liquids, and also reflected by metals,so the antenna position of the card reader module should be as far away from liquid and metal as possible, with clearance above 2cm .

2、The antenna is greatly affected by the installation structure.If the distance does not meet the requirements after assembling, please contact us for antenna matching immediately. And then carry out other certification work after adaptation.It is strongly recommended that the user carries out the adaptation in the sample stage.Please contact us for re adaptation, if the structure changes after adaptation.

3、The energy requirement of writing data to the tag is much higher than that of reading data from the tag, so the writing distance is generally shorter than the reading distance and allowance should be reserved while assembling.

4、-40~85℃ is the normal working temperature of the chip.There will be read-write instability if it is beyond the operating temperature range. Try to avoid using modules in extreme situations.

11. Statement

1. FCC 15.21 Information to user
   Please note that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. FCC 15.105 Information to the user (Class B)
   Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
   —Reorient or relocate the receiving antenna.
   —Increase the separation between the equipment and receiver.
   —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
   —Consult the dealer or an experienced radio/TV technician for help.

3. RF exposure statement
   This equipment complies with radio frequency exposure limits set forth by the FCC for an uncontrolled environment.
   This equipment should be installed and operated with a minimum distance of 20 cm between the device and the user or bystanders.
   IC RSS-Gen 8.4 User Manual Notice for Licence-Exempt Radio Apparatus
   This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
   (1) This device may not cause interference; and
   (2) This device must accept any interference, including interference that may cause undesired operation of the device.
   L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
   (1)L'appareil ne doit pas produire de brouillage;
   (2)L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
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5. RSS-102 2.6 User Manual Requirements
   This equipment complies with radio frequency exposure limits set forth by the Innovation, Science and Economic Development Canada for an uncontrolled environment.
   This equipment should be installed and operated with a minimum distance of 20cm between the device and the user or bystanders.
   This device must not be co-located or operating in conjunction with any other antenna or transmitter.
   Cet équipement est conforme aux limites d'exposition aux radiofréquences définies par la Innovation, Sciences et Développement économique Canada pour un environnement non contrôlé.
   Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre le dispositif et l'utilisateur ou des tiers.
   Ce dispositif ne doit pas être utilisé à proximité d'une autre antenne ou d'un autre émetteur.